

Attachment to Resolution No. 98-9, as amended by Resolution No. 98-100

Resolution Amending the Water Quality Control Plan for the Santa Ana River Basin to Incorporate a Nutrient TMDL for the Newport Bay/San Diego Creek Watershed

CHAPTER 5 - IMPLEMENTATION PLAN, Page 5-39

2. Eutrophication (Page 5-41)

Nutrient loading to the Bay, particularly from the San Diego Creek watershed, contributes to seasonal algal blooms which create a recreational and aesthetic nuisance. These algal blooms may also adversely affect wildlife.

The TMDL distributes the portions of the waterbody's assimilative capacity to various pollution sources so that the waterbody achieves its water quality standards. The Regional Board supports the trading of pollutant allocations among sources where appropriate. Trading can take place between point/point, point/nonpoint, and nonpoint/nonpoint pollutant sources. Optimizing alternative point and nonpoint control strategies through allocation tradeoffs may be a cost effective way to achieve pollution reduction benefits.

While there are a number of sources of nutrient input, tailwaters from the irrigation of agricultural crops and from several commercial nurseries in the watershed have been the predominant source. The Regional Board issued Waste Discharge Requirements to the three nurseries, requiring substantial reductions in their nutrient loads. Significant improvements have been achieved by these nurseries, largely due to the implementation of drip irrigation systems (which greatly reduce the amount of tailwater) and/or recycle systems. Installation of drip irrigation systems for other agricultural crops has also significantly reduced the volume of nutrient-laden tailwaters. These improvements, coupled with the increased tidal flushing caused by the in-bay basins, appears to have resulted in a substantial downward trend in nitrate concentrations in the Bay. **However, algal blooms are still occurring in Newport Bay and San Diego Creek. As a result, Newport Bay and San Diego Creek are listed as water quality impaired due to nutrients pursuant to Section 303(d) of the Clean Water Act. A nutrient TMDL to address this problem for Newport Bay and San Diego Creek is described in the following sections.**

The hydrodynamic, sediment transport, and water quality models of Newport Bay being jointly developed by the U.S. Army Corps of Engineers and the Regional Board will be used in the future to further refine the algae and nutrient relationships in the Bay. These refinements will be considered in future reviews and revisions of the nutrient TMDL.

2.a. Quantifiable Nutrient Targets

The annual loading of total nitrogen and phosphorus to Newport Bay shall be reduced by 50% by 2012. The seasonal and annual loading targets are listed in Table 5-9a.

Table 5-9a Summary of Loading Targets and Compliance Time Schedules.

TMDL	December 31, 2002⁵	December 31, 2007⁵	December 31, 2012⁵
Newport Bay Watershed Total Nitrogen - Summer Load¹	200,097 lbs.	153,861 lbs.	
Newport Bay Watershed Total Nitrogen - Winter Load²			144,364 lbs.
Newport Bay Watershed Total Phosphorus - Annual Load³	86,912 lbs.	62,080 lbs.	
San Diego Creek, Reach 2 Total Nitrogen - Daily Load⁴			14 lbs.

¹ Total nitrogen summer loading limit applies between April 1 and September 30.

² Total nitrogen winter loading limit applies between October 1 and March 31 when the mean daily flow rate at San Diego Creek at Campus Drive is below 50 cubic feet per second (cfs), and when the mean daily flow rate in San Diego Creek at Campus Drive is above 50 cubic feet per second (cfs), but not as the result of precipitation.

³ Total phosphorus annual loading is the sum of summer and winter loading during all daily flow rates.

⁴ Total nitrogen daily loading limit applies when the mean daily flow rate at San Diego Creek at Culver Drive is below 25 cubic feet per second (cfs), and when the mean daily flow rate in San Diego Creek at Culver Drive is above 25 cubic feet per second (cfs), but not as the result of precipitation.

⁵ Compliance to be achieved no later than this date. The Regional Board may require earlier compliance with these targets when it is feasible and reasonable.

The margin of safety of the nutrient TMDL is implicit through the use of conservative assumptions. These conservative assumptions include controlling all forms of nitrogen and phosphorus and controlling seasonal and annual loading.

Load Allocations

The 5, 10, and 15 year seasonal load allocations of total nitrogen for the Newport Bay Watershed are presented in Table 5-9b. The 5 and 10 year annual total

Table 5-9b Seasonal Load Allocations of Total Nitrogen for the Newport Bay Watershed.

Nutrient TMDL	1990-1997 Loading	2002 Allocation ⁸	2002 Summer Allocation (April-Sept) ⁸	2007 Allocation ⁸	2007 Summer Allocation (April-Sept) ⁸	2012 Allocation ⁸	2012 Winter Allocation (Oct-Mar) ^{7, 8, 11}
Newport Bay Watershed	lbs/year TN ²	lbs/day TN ¹⁰	lbs/season TN	lbs/day TN ¹⁰	lbs/season TN	lbs/day TN ¹⁰	lbs/season TN
Wasteload Allocation							
Hines Nurseries	96,360 TIN ¹	224	40,992	211	38,613	211	14,227
Bordiers Nursery	30,660 TIN	71	12,993	67	12,261	67	4,518
El Modeno Gardens	18,250 TIN	43	7,869	40	7,320	40	2,697
Unpermitted nurseries	----- ³	30	5,490	24	4,392	24	1,618
Nursery subtotal			67,344		62,586		23,060
IRWD WWSP (permanent discharge) ⁹	0	62		62		62	4,181
Silverado Constructors ETC ⁴	0	141	25,671	141	25,671	141	9,459
Urban runoff	277,131 ⁵		20,785		16,628		55,442
Wasteload Allocation			113,800		104,885		92,142
Load Allocation							
Agricultural discharges	328,040 ⁶		22,963		11,481		38,283
Undefined sources (Open space, atmospheric deposition, rising groundwater, groundwater cleanup/dewatering, in-bay nitrogen)	----- ³		63,334		37,495		13,939
Load Allocation			86,297		48,976		52,222
Total	1,087,000 ⁵		200,097		153,861		144,364
			5 year target		10 year target		15 year target

¹ TIN = (NO3+NH3).

² TN = (TIN + Organic N).

³ Unknown.

⁴ Wasteload allocation of a 50% reduction in nitrogen concentration upon commencement of discharge

⁵ 1990-1997 annual average (summer loading and winter loading).

⁶ Estimated annual average (summer and winter loading).

⁷ Total nitrogen winter loading limit applies between October 1 and March 31 when the mean daily flow rate at San Diego Creek at Campus Drive is below 50 cubic feet per second (cfs), and when the mean daily flow rate in San Diego Creek at Campus Drive is above 50 cubic feet per second (cfs), but not as the result of precipitation.

⁸ Compliance to be achieved no later than this date. The Regional Board may require earlier compliance with these targets when it is feasible and reasonable.

⁹ Daily load limit applies upon commencement of discharge.

¹⁰ Lbs/day TN (monthly average).

¹¹ Assumes 67 non-storm days.

phosphorus load allocations for the Newport Bay Watershed are presented in Table 5-9c. The 15 year daily total nitrogen load allocations for San Diego Creek, Reach 2 are presented in Table 5-9d. The nutrient load reduction targets will be incorporated into waste discharge requirements as effluent limits, load allocations, and wasteload allocations as necessary to ensure that:

- a. the total inorganic nitrogen and narrative water quality objectives for Newport Bay and San Diego Creek are achieved
- b. Clean Water Act requirements for the implementation of a TMDL are satisfied

Table 5-9c Annual Total Phosphorous Load Allocations For The Newport Bay Watershed.

	2002 Allocation lbs/year TP ¹	2007 Allocation lbs/year TP ¹
TMDL	86,912	62,080
Urban areas	4,102	2,960
Construction sites	17,974	12,810
Waste Load Allocation	22,076	15,770
Agricultural areas	26,196	18,720
Open space	38,640	27,590
Load Allocation	64,836	46,310

- ¹ Compliance to be achieved no later than this date. The Regional Board may require earlier compliance with these targets when it is feasible and reasonable.

Table 5-9d Annual Total Nitrogen Load Allocations For San Diego Creek, Reach 2 During Non-Storm Conditions.¹

	2012 Allocation lbs/day TN ²
TMDL	14 lbs/day (TN)
Waste Load Allocation (Urban runoff)	5.5 lbs/day (TN)
Load Allocation (Nurseries, agriculture, undefined sources)	8.5 lbs/day (TN)

- ¹ Total nitrogen loading limit applies when the mean daily flow rate at San Diego Creek at Culver Drive is below 25 cubic feet per second (cfs), and when the mean daily flow rate in San Diego Creek at Culver Drive is above 25 cubic feet per second (cfs), but not as the result of precipitation.
- ² Compliance to be achieved no later than this date. The Regional Board may require earlier compliance with these targets when it is feasible and reasonable.

2.b. Phase I of the Nutrient TMDL

1. Review and Revision of Water Quality Objectives

By December 31, 2000, the Regional Board shall review, and revise as necessary, the numeric water quality objectives for total inorganic nitrogen for San Diego Creek, Reaches 1 and 2. The Regional Board shall also examine the appropriateness of establishing numeric water quality objectives for phosphorus for San Diego Creek, Reaches 1 and 2.

2. Establish New Waste Discharge Requirements

By December 31, 1999, the Regional Board shall issue new Waste Discharge Requirements (WDRs) to nursery operations of 5 acres or greater which currently are not regulated by WDRs (as of the effective date of this amendment) but discharge nutrients in excess of 1 mg/L TIN to storm channels which are tributary to Newport Bay. The new WDRs shall incorporate the appropriate wasteload, load, and margin of safety allocations identified in the nutrient load targets for the Newport Bay Watershed. Appropriate monitoring programs to evaluate compliance with load targets and allocations shall be required and incorporated into the WDRs

3. Revision of Existing Waste Discharge Requirements

a. By December 31, 1998, the Regional Board shall revise existing WDRs for nursery operations which currently (as of the effective date of this amendment) discharge nutrients in excess of 1 mg/L TIN to drainages which are tributary to Newport Bay. The revised WDRs shall incorporate the appropriate wasteload, load, and margin of safety allocations identified in the nutrient load reduction targets for the Newport Bay Watershed. Appropriate monitoring programs to evaluate compliance with load targets and allocations shall be required and incorporated into the WDRs.

b. By December 31, 1998, the Regional Board shall revise existing NPDES permits for discharges which currently (as of the effective date of this amendment) discharge nutrients in excess of 1 mg/L TIN to drainages which are tributary to Newport Bay. The revised NPDES permits shall incorporate the appropriate wasteload, load, and margin of safety allocations identified in the nutrient load reduction targets for the Newport Bay Watershed. Appropriate monitoring programs to evaluate compliance with load targets and allocations shall be required and incorporated into the NPDES permits.

c. By March 31, 1999, the Regional Board shall revise the Monitoring and Reporting Programs of existing NPDES permits and WDRs for groundwater dewatering and cleanup operations which discharge to drainages which are tributary to Newport Bay to include requirements for phosphorus and total nitrogen sampling and analysis. This monitoring will generate the data necessary to develop appropriate wasteload allocations for these discharges.

4. Agricultural Activities

A watershed-wide nutrient management program for agricultural activities shall be developed by the Orange County Farm Bureau, University of California Cooperative Extension, and the affected growers, in conjunction with Regional Board staff. The proposed management program shall be submitted by July 1, 1999. The nutrient management program will not become effective until approved by the Regional Water Quality Control Board at a duly noticed public meeting as specified in Chapter 1.5, Division 3, Title 23 of the California Code of Regulations (Section 647 et seq.).

5. Urban Stormwater

Co-permittees of the Orange County Areawide Urban Stormwater Permit (Order No. 96-31) shall be required to submit for approval by the Regional Board's Executive Officer an analysis of appropriate Best Management Practices which will be additionally implemented through the Drainage Area Management Plan (DAMP) to achieve the short term (5-year) interim targets and final nutrient load reduction targets for the Newport Bay Watershed. The co-permittees shall also be required to provide a proposal for 1) evaluating the effectiveness of control actions implemented and 2) evaluating compliance with the nutrient load allocation. The proposal and analysis shall be submitted by July 1, 1999, and shall be implemented upon approval of the Executive Officer as specified by Section IV.1.a.ii.A of Order No. 96-31.

6. Phosphorus

The primary reduction of phosphorus loading is expected to be achieved by the implementation of the total maximum daily load for sediment in the Newport Bay/San Diego Creek watershed. The sediment TMDL is incorporated into the nutrient TMDL for the Newport Bay/San Diego Creek watershed by reference (Note - the sediment TMDL will be appropriately referenced once it is approved by OAL). Limits on phosphorus discharges shall be incorporated into the new and revised Waste Discharge Requirements previously listed, as necessary.

2.c. Phase II of the Nutrient TMDL

1. Monitoring

The Regional Board will establish and oversee a regional monitoring program (RMP) for the Newport Bay watershed. The new and revised WDRs, NPDES permits, DAMP, and agricultural nutrient management plans shall have include requirements to conduct self-monitoring, or in lieu of self-monitoring, to participate in the RMP. Participation in the RMP could result in the reduction of self-monitoring requirements. The RMP will not become effective until approved by the Regional Water Quality Control Board at a duly noticed public meeting as specified in Chapter 1.5, Division 3, Title 23 of the California Code of Regulations (Section 647 et seq.).

The RMP shall be designed by the Regional Board to assess the attainment of the goals of the nutrient TMDL. The objectives of the monitoring program shall be the quantification of the three endpoints of the nutrient TMDL: (1) the seasonal nutrient loading from the watershed; (2) the nutrient concentration in San Diego Creek, Reaches 1 and 2; and (3) the extent, magnitude, and duration of algal blooms in San Diego Creek and Newport Bay. The monitoring plan shall be implemented by March 1999.

The Regional Board will initiate investigations into the currently unknown sources of nutrients in the Newport Bay Watershed. The Regional Board, in cooperation with other agencies and entities, will investigate the occurrence of rising shallow groundwater in the Newport Bay Watershed. The study will focus on the contributions of rising groundwater to the loading of nutrients to drainage channels which are tributary to Newport Bay. Additionally, the study of the nutrient and algae processes of Newport Bay and San Diego Creek will be encouraged and supported by the Regional Board. Regional Board support could include financial resources, personnel, agency coordination, and scientific review.

2. Actions and Schedule to Achieve Water Quality Objectives

The actions and schedule to achieve water quality objectives is outlined in Table 5-9e. Meeting load reduction targets is highly dependent upon the effectiveness of individual actions, therefore, the Regional Board will review the TMDL, WDRs and compliance schedule at least once every 3 years. Any or all of these may be revised in order to meet water quality standards.

Table 5-9e Schedule of Actions to Achieve Water Quality Objectives.

Program Actions	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Review and revision of water quality objectives			X													
New nursery permits		X														
Revise existing permits	X															
Nurseries	X															
NPDES permit	X															
Groundwater cleanup/dewatering		X														
Agricultural nutrient management plans		X														
Urban runoff BMP plan		X														
Sediment TMDL implementation	X															
Monitoring		X														
Newport Bay Watershed total nitrogen - summer TMDL targets					X					X						
Newport Bay Watershed total nitrogen - winter TMDL target															X	
Newport Bay Watershed total phosphorus - annual TMDL targets					X					X						
San Diego Creek, Reach 2 total nitrogen - daily target															X	
Evaluation of TMDL			X			X			X		X			X		X

2.d. Estimated Costs of Agricultural Water Quality Control Programs and Potential Sources of Financing

The estimates of capital and operational costs to achieve the nutrient targets of the nutrient TMDL for the San Diego Creek/Newport Bay watershed range from \$0.69 million/year to \$4.73 million/year.

Potential funding sources include:

- 1. Private financing by individual sources.**
- 2. Bonded indebtedness or loans from governmental institutions.**
- 3. Surcharge on water deliveries to lands contributing to the drainage problem.**
- 4. Ad Valorem tax on lands contributing to the drainage problem.**
- 5. State or federal grants or low-interest loan programs.**
- 6. Single-purpose appropriations from federal or State legislative bodies (including land retirement programs).**